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BROOME, SAID A	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/816,623	Applicant(s) PETERSON, SCOTT B.
	Examiner Said Broome	Art Unit 2628

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 March 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-92* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,9-11,13-17,19-24,29,31-36,38-43,48,49,54-60,65,70-75,77-80,82-85 and 88-92* is/are rejected.

7)☒ Claim(s) *5-8,12,18,25-28,30,37,44-47,50-53,61-64,66-69,76,81 and 86* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This office action is in response to an amendment filed on 3/12/2007.
2. Claims 1, 21, 40, 57, 73, 79, 84 and 87-91 have been amended by the applicant.
3. Claims 2-20, 22-39, 42-56, 58-72, 74-78, 80-83, 85, 86 and 92 are original.
4. Claims 93-101 have been cancelled.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4, 9, 11, 13, 17, 19-24, 29, 31, 32, 36, 38-43, 48, 49, 57-60, 65, 73-75, 77-80, 82-85 and 88-92 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lengyel et al.(hereinafter "Lengyel", US Patent 6,606,095).

Regarding claims 1, 73, 79 and 84, Lengyel teaches a computer implemented method for compressing a file of an animation model for an animation cycle comprising a plurality of frames of animation of the animation model in column 9 lines 35-40 ("*...a method for compressing time-dependent geometry by approximating the motion of 3D geometry...for selected time samples throughout an animation sequence.*"), the model comprising an offset data corresponding to vertices of an offset model, described in column 34 line 25 ("*...3D offset data...*") and in column 16 lines 16-18 ("*The current mesh...transformed...in predicting the*

position of the mesh for the next frame.") including a plurality of surfaces, described in column 1 lines 31-34 ("*...models are typically represented as sets of 3D coordinates that define the position of a mesh of surface elements...*"), with each surface including a plurality of vertices, as described in column 5 lines 8-18 ("*Each column...represents a 3D position, such as a vertex position in a 3D mesh...3D positions...describe the 3D surface of an object.*"). Lengyel teaches predicting offset vertices of the offset model for corresponding reference vertices of a reference model for a first frame of the animation cycle and associated with the offset model in column 15 lines 15-18 ("*Starting with an initial mesh as a predictor for the mesh of the first frame...to map the approximate vertices V' of the previous frame to the mesh of the next frame.*") and in column 16 lines 16-18 ("*The current mesh must be transformed...for use in predicting the position of the mesh for the next frame.*"), where it is described that the offset vertices of a next frame is predicted from the vertices of a previous or reference frame within frames of animation. Though Lengyel does not specifically teach using a basis coordinate system associated with the reference vertices, it would have been obvious to one of ordinary skill in the art at the time of invention to utilize a selected base mesh, as described in column 9 line 49, as reference vertices of the mesh described in column 9 lines 51-53, because by utilizing reference vertices of a mesh accurate generation of successive frames is ensured through using the coordinate of the reference vertices as a basis for successive frames, thereby eliminating the need to generate vertices for each frame independently and reducing the amount of data required to produce a plurality of frames of animation. Lengyel teaches determining differences between the predicted offset vertices and actual offset vertices of the offset model for each subsequent frame of the animation cycle in column 5 lines 8-18 ("*Each column in matrix P represents a 3D position, such as a vertex*

position in a 3D mesh...3D positions...describe the 3D surface of an object.“), where it is described that a matrix represents the 3D position of a model, wherein matrix is used to calculate the difference between the offset predicted positions and referenced actual positions in column 17 lines 62-67 – column 18 lines 1-3 (“*The compressor 160 performs row/column prediction by computing the difference between each corresponding element between a reference...and another...the prediction...is a matrix of difference values.*“) and in column 16 lines 15-18 (“*The current mesh must be transformed...for use in predicting the position of the mesh for the next frame.*“). Lengyel teaches storing as a compressed file in a database the reference model in column 10 lines 42-45 (“*...geometry is encoded for...storage and then...input to the compressor 20:...a base mesh...*“) and differences between the predicted offset vertices and actual offset vertices in column 10 lines 47-49 to allow reconstruction of the actual offset vertices using the reference vertices in column 4 lines 19-21 and the differences for each subsequent frame of the animation cycle in column 17 lines 62-67 (“*The compressor 160 performs...prediction by computing the difference between each corresponding element between a reference row/column and another row/column...*“) and in column 15 lines 15-18 (“*Starting with an initial mesh...for the mesh of the first frame...map the approximate vertices V' of the previous frame to the mesh of the next frame.*“). Lengyel teaches storing as a compressed file in a database the reference model and differences between the predicted offset vertices and actual offset vertices in column 16 lines 4-18 (“*The compressor then computes...the difference between the current mesh transformed to the coordinates of the previous...The current mesh must be...stored separately for use in predicting the position of the mesh for the next frame.*“) to allow reconstruction of the actual offset vertices using the reference vertices and the differences in column 16 lines 16-18

(*"The current mesh must be transformed...for use in predicting the position of the mesh for the next frame.*") and in column 12 lines 50-67 – column 13 line 1-3 (*"A subtractor ...computes the difference between the 3D positions of the transformed base mesh and the current mesh to produce a residual...The adder module 82 takes the transformed base mesh and combines it with the residual mesh for that time to reconstruct a mesh.*") for each subsequent frame of the animation cycle, as described in column 9 lines 43-53 (*"...geometry of an animation sequence is expressed as a series of 3D meshes...of vertex positions at a particular time...this method determines the difference between a transformed base mesh and the actual mesh..."*).

Regarding claims 2, 22, 41, 58, Lengyel teaches that at least one basis coordinate system, which is the coordinate system of the selected base mesh vertices described in column 9 line 49, are vertices previously traversed in column 17 lines 55-57 (*"...a reference...used as a basis to predict motion..."*) and in column 14 lines 62-64 (*"...a geometric transform coder can...use the mesh of the previous frame as base mesh..."*), where it is described that the base mesh comprises vertices from a previous frame, therefore the vertices of the mesh have been previously traversed.

Regarding claims 3, 23, 42, 59, Lengyel teaches at least one basis coordinate system defined by the vertex coordinates of the base mesh, is a triangle defined by three vertices nearby the reference vertex in column 2 lines 19-20, where it is described that the vertices of triangles may be utilized for compression, therefore it is obvious that the three reference vertices of the triangle would be nearby a reference vertex because one of the three would be utilized as the reference vertex of the base mesh, described in column 9 line 49, for prediction of offset vertices, as described in column 11 lines 1-2.

Regarding claims 4, 24, 43, 60, Lengyel teaches at least one basis coordinate system, defined by the vertex coordinates of the base mesh, comprises a preconfigured triangle based on a reference vertex in column 11 lines 1-2 and in column 2 lines 19-20, where it is described that a produced mesh is based on a previous mesh, which is known in the art to comprise a triangle mesh surface, therefore the surface contains predefined polygonal triangles utilized as a reference vertex of a previous mesh.

Regarding claims 9, 48, 83 and 87, Lengyel teaches selecting a reference vertex on the reference model in column 9 lines 48-49 ("*...coding method begins by selecting a base mesh.*") and a corresponding offset vertex in column 9 lines 49-53 ("*It then determines a geometric transform between the base mesh and each of the meshes in the animation...this method determines the difference between a transformed base mesh and the actual mesh...*"), where the reference vertex therefore corresponds to a base mesh and the actual mesh therefore comprises the associated offset vertices. Lengyel teaches selecting a basis coordinate system defined by vertices nearby the reference vertex on the reference model with respect to the reference vertex in column 11 lines 1-2 ("*...geometric transformation parameters used to transform the position of the base mesh to a new position...*"), where the base mesh therefore provides basis coordinates that are referenced as a reference vertex. Lengyel teaches selecting a basis coordinate system on the offset model in column 11 lines 8-11 ("*Since the transformation parameters are used to transform the base mesh to a new position for each time sample, each sample has a corresponding set of transformation parameters.*"), where it is described that the coordinates of the new offset model contain a correspond position to the base mesh, therefore the offset model contains associated basis coordinates. Lengyel teaches determining a position of the reference

vertex in the basis coordinate system in column 17 lines 55-57 (*"It is also possible to select a reference...that are used as a basis to predict motion..."*), and predicting the offset vertex by applying the position of the reference vertex in the basis coordinate system on the reference model to the basis coordinate system on the offset model in column 9 lines 35-39 (*"...compressing time-dependent geometry by approximating the motion of 3D geometry...and then encoding the difference between transformed 3D geometry and the actual position of the 3D geometry..."*) and in column 15 lines 15-18 (*"Starting with an initial mesh as a predictor for the mesh of the first frame...to map the approximate vertices V' of the previous frame to the mesh of the next frame."*), where it is described that the actual or offset positions are predicted through referencing a previous base mesh, as described in column 9 lines 48-53, in which the vertices of the base mesh are therefore utilized as a basis for the vertex coordinates of the offset model.

Regarding claims 11, 29, 49 and 65, Lengyel teaches determining a reference vector for the position of the reference vertex in the basis coordinate system, or originating position, on the reference model in column 3 lines 45-46. Lengyel teaches determining a corresponding offset vector for the reference vertex in the basis system of the offset model in column 3 lines 45-48 (*"...time dependent geometry can be decomposed into basis vectors...The basis vectors...can be used to compute...an approximation of the original...from the basis...and then encoding the difference between original...and the approximate..."*).

Regarding claims 13, 31 and 74, Lengyel teaches selecting seed vertices in column 17 lines 55-57 (*"It is also possible to select a reference...that are used as a basis to predict motion..."*), where reference or seed vertices are selected from a reference mesh. Lengyel also

teaches quantizing the seed vertices in column 10 lines 21-23 ("...*the geometric transform method quantizes...the base mesh*...").

Regarding claims 17, 36, 75 and 80, Lengyel teaches quantizing the differences in column 9 lines 51-54 ("...*this method determines the difference between a transformed base mesh and the actual mesh, called the residual.*") and in column 10 lines 21-23 ("...*the geometric transform method quantizes...the residual.*").

Regarding claims 19, 38, 78, 82 and 85, Lengyel teaches compressing differences into a compressed data set using entropy based compression algorithm in column 34 lines 31-37.

Regarding claims 20, 39 and 77, Lengyel teaches comprising seed, or base, vertices using an entropy compression algorithm in column 35 lines 43-44 ("...*basis vectors can be compressed...using entropy*...").

Regarding claims 21 and 57, Lengyel teaches a computer implemented method for compressing a file of an animation model in column 9 lines 35-40 ("...*a method for compressing time-dependent geometry by approximating the motion of 3D geometry...for selected time samples throughout an animation sequence.*"), the model comprising an offset model, described in column 34 lines 25 ("...*3D offset data*...") including a plurality of surfaces, described in column 1 lines 31-34 ("...*models are typically represented as sets of 3D coordinates that define the position of a mesh of surface elements*..."), with each surface including a plurality of vertices, as described in column 5 lines 8-18 ("*Each column...represents a 3D position, such as a vertex position in a 3D mesh...3D positions...describe the 3D surface of an object.*"). Lengyel teaches traversing a plurality of reference vertices on a surface of a reference model for a first frame of the animation cycle and associated with the offset model in

column 9 lines 48-51 ("*...geometric transform...begins by selecting a base mesh...then...a geometric transform between the base mesh and each of the meshes in the animation.*"), where it described that a reference or base mesh surface is selected to be associated with a subsequent offset mesh, therefore at least one or more vertices of the base mesh are traversed during selection in order to capture vertices for a corresponding offset mesh surface. Lengyel teaches selecting an offset vertex of the offset model corresponding to the reference vertex in column 11 lines 1-2, where it is described that a mesh is transformed to a new position, therefore the position of the offset surface of the new mesh is selected when the transform is performed. Lengyel teaches selecting an offset vertex of the offset model corresponding to the reference vertex in column 15 lines 15-18, where it is described that a corresponding offset mesh is generated with respect to a base mesh, therefore the offset mesh selected for correspondence to the reference mesh vertices. Lengyel also teaches selecting a basis coordinate system, or origin, on the reference model with respect to the reference vertex in column 9 lines 48-49 ("*...method begins by selecting a base mesh.*") and a corresponding offset vertex in column 9 lines 49-54, where it is described that a base mesh surface is utilized for transformation to a new position, therefore the coordinates of the mesh surface are defined and selected prior as the transformation is performed. Lengyel teaches providing the basis coordinates for the reference vertex in column 11 lines 1-2, where it is described that a base mesh is referenced as an originating position to which an offset mesh is generated, therefore the coordinates of the base mesh provide the reference vertices. Lengyel teaches selecting a basis coordinate system, or origin, on the offset model in column 11 lines 1-2, where it is described that the position of the offset mesh surface is chosen with respect to a reference base mesh therefore the originating

position, or origin, of the offset model is chosen when the new position is generated. Lengyel teaches determining a position of the reference vertex in the basis coordinate system on the reference model in column 17 lines 55-57 ("*It is also possible to select a reference...that are used as a basis to predict motion...*"); and predicting the offset vertex by applying the position of the reference vertex in the basis coordinate system on the reference model to the basis coordinate system on the offset model in column 15 lines 15-18; determining a difference between the predicted offset vertex and an actual offset vertex of the offset model for each subsequent frame of the animation model in column 17 lines 62-67 – column 18 lines 1-3 ("*The compressor 160 performs row/column prediction by computing the difference between each corresponding element between a reference row/column and another row/column...output of the prediction...is a matrix of difference values.*") and in column 16 lines 15-18 ("*The current mesh must be transformed...for use in predicting the position of the mesh for the next frame.*"). Lengyel teaches storing as a compressed file in a database the reference model and the difference between the predicted offset vertex and actual offset vertex for each subsequent frame of the animation cycle in column 16 lines 4-18 ("*The compressor then computes...the difference between the current mesh transformed to the coordinates of the previous...The current mesh must be...stored separately for use in predicting the position of the mesh for the next frame.*").

Regarding claim 40, Lengyel teaches predicting offset vertices of the offset model for corresponding reference vertices of a reference model for a first frame of the animation cycle and associated with the offset model in column 15 lines 15-18 ("*Starting with an initial mesh as a predictor for the mesh of the first frame...to map the approximate vertices V' of the previous*

frame to the mesh of the next frame.") and in column 16 lines 16-18 ("*The current mesh must be transformed...for use in predicting the position of the mesh for the next frame.*"), where it is described that the offset vertices of a next frame is predicted from the vertices of a previous or reference frame within frames of animation. Lengyel teaches retrieving from a database of a compressed animation model file, or storage medium, previously stored differences between the predicted offset vertices and actual offset vertices of the offset model for a subsequent frame of animation in column 16 lines 16-18 ("*The current mesh must be transformed...for use in predicting the position of the mesh for the next frame.*") and in column 16 lines 4-18 ("*The compressor then computes...the difference between the current mesh transformed to the coordinates of the previous...The current mesh must be...stored...for use in predicting the position of the mesh for the next frame.*"), therefore though Lengyel does not specifically teach storing difference of the offset vertices for each subsequent frame of an animation cycle, it would have been obvious to one of ordinary skill in the at the time of invention to enable successive calculation of the offset difference for not only the next frame, but every subsequent frame of animation as well because calculation of the offset vertex differences of each subsequent frame would provide a substantial reduction in processing through requiring storage of only the difference values and not the vertices of every mesh surface in each independent frame of animation. Lengyel also teaches combining the predicted offset vertices and the retrieved differences to produce the offset vertices of the offset model for each subsequent frame of the animation in column 16 lines 16-18 ("*The current mesh must be transformed...for use in predicting the position of the mesh for the next frame.*") and in column 12 lines 50-67 – column 13 line 1-3 ("*A subtractor...computes the difference between the 3D positions of the transformed*

base mesh and the current mesh to produce a residual...The adder module 82 takes the transformed base mesh and combines it with the residual mesh for that time to reconstruct a mesh.").

Regarding claim 88, Lengyel teaches predicting offset vertices of the offset model for corresponding reference vertices of a reference model for a first frame of the animation cycle and associated with the offset model in column 15 lines 15-18 ("*Starting with an initial mesh as a predictor for the mesh of the first frame...to map the approximate vertices V' of the previous frame to the mesh of the next frame.*") and in column 16 lines 16-18 ("*The current mesh must be transformed...for use in predicting the position of the mesh for the next frame.*"), where it is described that the offset vertices of a next frame is predicted from the vertices of a previous or reference frame within frames of animation. Lengyel teaches determining differences between the predicted offset vertices and actual vertices of the offset model in column 5 lines 8-18 ("*Each column in matrix P represents a 3D position, such as a vertex position in a 3D mesh...3D positions...describe the 3D surface of an object.*"), where it is described that a matrix represents the 3D position of a model, wherein matrix is used to calculate the difference between the offset predicted positions and referenced actual positions in column 17 lines 62-67 – column 18 lines 1-3 ("*The compressor 160 performs row/column prediction by computing the difference between each corresponding element between a reference...and another...the prediction...is a matrix of difference values.*") and in column 16 lines 15-18 ("*The current mesh must be transformed...for use in predicting the position of the mesh for the next frame.*"). Lengyel teaches storing as a compressed file in column 10 lines 42-45 ("*...geometry is encoded for...storage and then...input to the compressor 20:...a base mesh...*"), differences between the predicted offset vertices and

actual offset vertices in column 10 lines 47-49, for an animation mesh model. Lengyel teaches retrieving from a database of a compressed animation model file, or storage medium, previously stored differences between the predicted offset vertices and actual offset vertices of the offset model for a subsequent frame of animation in column 16 lines 16-18 ("*The current mesh must be transformed...for use in predicting the position of the mesh for the next frame.*") and in column 16 lines 4-18 ("*The compressor then computes...the difference between the current mesh transformed to the coordinates of the previous...The current mesh must be...stored...for use in predicting the position of the mesh for the next frame.*"), therefore though Lengyel does not specifically teach storing difference of the offset vertices for each subsequent frame of an animation cycle, it would have been obvious to one of ordinary skill in the at the time of invention to enable successive calculation of the offset difference for not only the next frame, but every subsequent frame of animation as well because calculation of the offset vertex differences of each subsequent frame would provide a substantial reduction in processing through requiring storage of only the difference values and not the vertices of every mesh surface in each independent frame of animation. Lengyel also teaches combining the predicted offset vertices and the retrieved differences to produce the offset vertices of the offset model for each subsequent frame of the animation in column 16 lines 16-18 ("*The current mesh must be transformed...for use in predicting the position of the mesh for the next frame.*") and in column 12 lines 50-67 – column 13 line 1-3 ("*A subtractor...computes the difference between the 3D positions of the transformed base mesh and the current mesh to produce a residual...the decompressor...represents a component used to decode a compressed data stream and*

reconstruct a stream of time-dependent geometry... The adder module 82 takes the transformed base mesh and combines it with the residual mesh for that time to reconstruct a mesh.").

Regarding claims 89 and 91, Lengyel teaches compressing an animation model by compressing a geometric representation of the surface of the offset model in column 9 lines 35-40 and in column 17 lines 62-67 for a subsequent frame at a first time with respect to a reference model for the first frame of animation at a second time earlier than the first time in column 15 lines 15-18 ("*Starting with an initial mesh as a predictor for the mesh of the first frame... to map the approximate vertices V' of the previous frame to the mesh of the next frame.*") and in column 16 lines 16-18 ("*The current mesh must be transformed...for use in predicting the position of the mesh for the next frame.*"), where it is described that the offset vertices of a next frame is predicted from the vertices of a previous or reference frame within frames of animation, therefore though Lengyel does not specifically teach compressing the offset surface for each subsequent frame of an animation cycle, it would have been obvious to one of ordinary skill in the at the time of invention to enable compression of the offset model for not only the next frame, but every subsequent frame of animation as well because compression of the offset vertices of each subsequent frame would provide a substantial reduction in processing through requiring storage of only the compressed difference values and not the vertices of every mesh surface in each independent frame of animation.

Regarding claim 90, Lengyel teaches retrieving from a database of a compressed animation model file, or storage medium, a geometric representation of a surface of the offset vertices at a first time with respect to a reference model at an earlier second time in the animation in column 16 lines 16-18 ("*The current mesh must be transformed...for use in predicting the*

position of the mesh for the next frame.") and in column 16 lines 4-18 ("*The compressor then computes...the difference between the current mesh transformed to the coordinates of the previous...The current mesh must be...stored...for use in predicting the position of the mesh for the next frame.*"). Lengyel teaches decompressing the compress geometric representation file with respect to the reference model at the second time to produce the offset model at the first time of animation in column 16 lines 7-10 ("...*decompressor reconstruct a current mesh...by combining the approximate mesh of the previous frame with the transformed current mesh.*"), therefore though Lengyel does not specifically teach decompressing the geometric representation for each subsequent frame of an animation cycle, it would have been obvious to one of ordinary skill in the at the time of invention to enable successive decompression of the model for not only the next frame, but every subsequent frame of animation as well because decompression of the produced offset model of each subsequent frame would provide a substantial reduction in processing through requiring storage of only the decompressed vertices of a surface and not the vertices of every mesh surface in each independent frame of animation.

Regarding claim 92, Lengyel teaches a reference model comprising a plurality of reference vertices describing the surface of the model in column 15 lines 15-18 ("*Starting with an initial mesh as a predictor for the mesh of the first frame...to map the approximate vertices V' of the previous frame to the mesh of the next frame.*"). Lengyel also teaches compressing vertices of the reference model in column 9 lines 35-40. Lengyel teaches a plurality of seed vertices, each seed vertex corresponding to a row of reference vertices of the reference model associated with the offset model, the seed vertices for predicting a plurality of offset vertices on a surface of the offset model in column 17 lines 62-67 – column 18 lines 1-3 ("*The compressor*

160 performs row... prediction by computing the difference between each corresponding element between a reference row...and another row...output of the prediction...is a matrix of difference values.") and in column 16 lines 15-18 ("*The current mesh...transformed...for use in predicting the position of the mesh for the next frame.*"). Lengyel teaches a plurality of differences between predicted offset vertices and actual offset vertices, for combining with the plurality of offset vertices predicted from the seed vertices to produce a plurality of final offset vertices on the surface of the offset model in column 16 lines 16-18 ("*The current mesh must be transformed...for use in predicting the position of the mesh for the next frame.*") and in column 12 lines 50-67 – column 13 line 1-3 ("*A subtractor ...computes the difference between the 3D positions of the transformed base mesh and the current mesh to produce a residual...the decompressor...represents a component used to decode a compressed data stream and reconstruct a stream of time-dependent geometry...The adder module 82 takes the transformed base mesh and combines it with the residual mesh for that time to reconstruct a mesh.*").

Claims 10, 14-16, 33-35, 54-56 and 70-72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lengyel in view of Taubin et al.(hereinafter "Taubin" "*Geometry Coding and VRML*").

Regarding claims 10, 14, 33, 54 and 70, Lengyel fails to teach the limitations. Taubin teaches traversal of a mesh surface in a zig-zag pattern in section IV 3rd ¶ lines 3-7 – 4th ¶ lines 1-3 ("*Models composed strictly of triangles can be compressed by constructing triangle...each new vertex reference implicitly defines a new triangle. The trailing edge of the previous triangle is used with the incremental vertex index to form the next triangle in an alternating, "zigzag"*

fashion."), therefore the previous vertice and the next offset vertice of the mesh surface is traverse in a zig-zag manner. It would have been obvious to one of ordinary skill in the art to combine the teachings of Lengyel with Taubin because this combination would enable efficient traversal of a mesh surface wherein adjacent vertices over the entire surface are quickly traversed for compression thereby ensuring that vertices that reside within different rows or edges are not excluded during surface compression.

Regarding claims 15, 32, 55 and 71, Lengyel fails to teach the limitations. Taubin teaches predicting offset vertices by traversing the surface of the reference model in a hierarchical traversal pattern in section *V. A. 6)* 1st ¶ lines 3-4 ("*...we can use ancestors in the tree to predict vertex positions...*"). The motivation to combine the teachings of Lengyel with Taubin is equivalent to the motivation of claim 14.

Regarding claims 16, 33, 56 and 72, Lengyel fails to teach the limitations. Taubin teaches predicting offset vertices by traversing the surface of the reference model in a triangle-based traversal pattern in section IV 3rd ¶ lines 3-7 – 4th ¶ lines 1-3 ("*Models composed strictly of triangles can be compressed by constructing triangle...where each new vertex reference implicitly defines a new triangle. The trailing edge of the previous triangle is used with the incremental vertex index to form the next triangle...*"). The motivation to combine the teachings of Lengyel with Taubin is equivalent to the motivation of claim 14.

Claim Objections

Claims 5-8, 12, 18, 25-28, 30, 37, 44-47, 50-53, 61-64, 66-69, 76, 81 and 86 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments with respect to claims 1-92 have been considered but are moot in view of the new ground(s) of rejection.

Claims 21-30, 32-39 and 57-78 were previously rejected under 101 and were objected to, however due to the amendments to the claims which change the scope of the claims, the claims remain rejected, now under a new grounds of rejection using 35 U.S.C. 103(a).

The 35 U.S.C. 101 rejection of claims 1-78, 88-95 and 98-100 has been withdrawn due to the amendments to claims 1, 21, 40, 57, 73 and 88-91, and with respect to the current interpretation of 35 U.S.C. 101 in which as long as a practical application is claimed or disclosed in the Specification, the claims are statutory.

The previous 35 U.S.C. 102(b) and 35 U.S.C. 103(a) rejections have been withdrawn and claims 1-4, 9-11, 13, 14-17, 19-24, 29, 31-36, 38-43, 48, 49, 54-60, 65, 70-75, 77-80, 82-85 and 88-92 are rejected under a new grounds of rejection, as recited above.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Said Broome whose telephone number is (571)272-2931. The examiner can normally be reached on M-F 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on (571)272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Said Broome/
Art Unit 2628
6/20/07

UChauhan
Ulka Chauhan
Supervisory Patent Examiner